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ANNUAL REPORT
OF THE
TRANSIT DEPARTMENT



CITY OF BOSTON

1933

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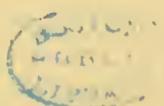
TRANSIT DEPARTMENT—CITY OF BOSTON

THOMAS F. SULLIVAN, *Chairman*,
NATHAN A. HELLER,
ARTHUR B. CORBETT,
Commissioners.

REPORT
OF THE
TRANSIT DEPARTMENT
FOR THE
YEAR ENDING DECEMBER 31, 1933



CITY OF BOSTON
PRINTING DEPARTMENT
1934



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1933

Carrie Elton of Pittsburgh
July 2, 1962.



ANNUAL REPORT
OF THE
TRANSIT DEPARTMENT
FOR THE YEAR ENDING DECEMBER 31, 1933.

1 BEACON STREET, BOSTON, MASS., January 1, 1934.

To the Mayor and City Council of the City of Boston:

The Transit Department submits the following report for the year ending December 31, 1933.

EAST BOSTON VEHICULAR TUNNEL.

The activities of the Department have been devoted almost entirely to the work of installing and equipping the tunnel with the apparatus necessary for its successful operation. This included constructing fresh air and exhaust air ducts, connecting fans and blowers provided to furnish sufficient air for proper ventilation, laying granite block in the tunnel and the East Boston incline, pumping equipment to take care of drainage water, glazed tile wall finish, lighting units, installation of cable and wire for operating fans, lights, signals, telephones, pumps, etc., approximately 675 miles of such wire being required. From the present rate of progress it is anticipated that the tunnel will be ready for public use about the first of next July.

HAYMARKET SQUARE IMPROVEMENT.

On May 31, the Department acquired for the City by eminent domain property necessary for the widenings authorized for this improvement, a total of thirty-nine parcels being taken.

HUNTINGTON AVENUE SUBWAY.

Chapter 366 of the Acts of the Legislature of 1933, Part II, provided under conditions named therein for the construction of a subway connecting with or being an extension of any existing subway. Section 14 provided that Part II of the Act should take effect only upon its acceptance both by vote of the City Council of Boston, approved by the Mayor, and by the Boston Elevated Railway Company by vote of its Board of Directors, and upon the filing of certificates of such acceptances with the State Secretary, provided that such acceptances, approval and filing occurred during the current year.

The act further provided that the Emergency Finance Board and the Governor approve the public works project as provided therein and that the project so approved be also approved by the proper Federal authorities and a substantial part of the cost of construction be obtained under the provisions of the National Industrial Recovery Act.

Notice was received from the City Clerk that Part II of the act was accepted by the City Council on August 7 and approved by His Honor the Mayor on August 8, and immediately thereafter the Department proceeded to make preliminary investigations, surveys and plans. On August 10 the Board of Directors of the Boston Elevated Railway Company voted to accept Part II upon the understanding that the subway to be constructed was the Huntington Avenue Subway and that their acceptance was not to be regarded as effective in so far as the construction of any other or different subway was concerned. Evidences of such acceptances by the City Council and the Directors of the Boston Elevated Railway and the approval of His Honor the Mayor were filed with the Secretary of the Commonwealth as required. Approval on the part of the Emergency Finance Board, however, was withheld and the authorization for the construction of this subway accordingly became inoperative.

DECEASE OF ERNEST R. SPRINGER.

Ernest R. Springer, Chief Engineer of the Department, died on February 19, and the following was ordered placed upon the records of the Commission:

Ernest R. Springer, Chief Engineer of the Department, has passed on, after twenty-one years of service to the City of Boston. Severing his

connection with the engineering staff of the Boston Elevated Railway Company after he had designed the Cambridge Subway, he came to this Department on March 25, 1912, as an assistant engineer. On September 16, 1914, he was promoted to the position of designing engineer. Upon the retirement of Chief Engineer Edmund S. Davis, Mr. Springer on July 1, 1920, was appointed as his successor. His promotion to this important post was prompted by a spontaneous recognition that here was a man who abundantly possessed those rare qualities which had distinguished Howard A. Carson and Edmund S. Davis, his eminent predecessors.

That Mr. Springer fully merited and justified the confidence thus expressed by the Transit Commission is demonstrated by a record of achievement which will forever adorn his régime as chief engineer. To succeed Carson and Davis with the expectation of maintaining the high standards of engineering skill for which they had received international recognition, would have given pause to one less well-equipped than Ernest R. Springer. Endowed with keen native intelligence enriched by thorough academic grounding and practical training, possessed of a lively imagination and a seemingly inexhaustible capacity for work, spurred on by an indomitable will, stalwart and unafraid, yet withal kindly, gentle and serene, he brought to bear in the solution of the many perplexities inherent in the construction of the Arlington Station of the Boylston Street Subway, the Maverick Square Station of the East Boston Tunnel, the Dorchester Rapid Transit, the Boylston Street Subway Extension, and the East Boston Traffic Tunnel, a delicately balanced combination of attributes which levelled all obstacles and assured successful fruition.

By his untimely demise the community has suffered the loss of a devoted public servant, who, in the full flower of vigorous manhood, held out promise of further and possibly even more valuable contributions to the public comfort and welfare. To his colleagues and subordinates the sense of loss is too poignant, too enveloping, to admit of formulation. To them is given the slight solace and comfort that the standards which he established and conscientiously followed in the practice of his profession are living precepts and guides, motivating each day and each hour the being and conduct of the Department to which he gave his all.

Wilbur W. Davis, Assistant Chief Engineer of the Department, was promoted to Chief Engineer on March 1, to fill the vacancy caused by the death of Ernest R. Springer.

PARK STREET STATION OF CAMBRIDGE CONNECTION.

Alterations of entrances and exits in front of the Shepard Stores, Inc., Tremont street, were made whereby the existing headhouse and large illuminated sign over stairways F and G were removed and a standard type low stairway covering was erected in place thereof.

SINKING FUNDS.

The following is the condition of the debt and of the sinking funds for the various divisions of the work of the Department at the date of this report, as stated by the City Treasurer:

SUBWAY (INCLUDING ALTERATIONS).

(*Debt, \$4,416,000, outside debt limit.*)

Amount of fund January 1, 1933	.. . . .	\$3,838,281 66
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$263 86
Interest on investments January 1, 1933		
to date	.. . . .	152,306 52
Premium on investments January 1, 1933		
to date	.. . . .	1,793 75
Revenue, etc., January 1, 1933 to date	.. . . .	1,218 00
		155,582 13
		\$3,993,863 79

Paid:

Interest on investments purchased January 1, 1933 to date	.. . . .	1,875 19
\$3,991,988 60		

CHARLESTOWN BRIDGE, NO. 1.

(*Debt, \$750,000, inside debt limit.*)

Amount of fund January 1, 1933	.. . . .	\$666,787 98
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$37 74
Interest on investments January 1, 1933		
to date	.. . . .	25,721 25
Revenue, etc., January 1, 1933 to date	.. . . .	3,461 64
Appreciation of investments January 1, 1933 to date	.. . . .	471 30
		29,691 93
		\$696,479 91

Paid:

Interest on investments purchased January 1, 1933 to date	10 00
\$696,469 91		

TRANSIT DEPARTMENT.

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CHARLESTOWN BRIDGE, NO. 2.

(Debt, \$665,000, outside debt limit.)

Amount of fund January 1, 1933		\$665,000 00
Received:		
Interest on bank deposits January 1, 1933		
to date	\$33 22	
Interest on investments January 1, 1933		
to date	25,631 66	
Premium on investments January 1, 1933		
to date	850 00	
	<hr/>	
		26,514 88
	<hr/>	
		\$691,514 88

Paid:

Transferred to "Moneys for Reduction of Debt," being excess of funds over amount of debt		26,514 88
<hr/>		
		\$665,000 00

BOSTON TUNNEL AND SUBWAY.

(Debt, \$8,352,700, outside debt limit.)

Amount of fund January 1, 1933		\$4,309,383 90
Received:		
Interest on bank deposits January 1, 1933		
to date	\$409 18	
Interest on investments January 1, 1933		
to date	164,834 34	
Revenue, etc., January 1, 1933 to date		60,556 00
Premium on investments January 1, 1933		
to date	800 00	
	<hr/>	
		226,599 52
	<hr/>	
		\$4,535,983 42

CAMBRIDGE CONNECTION.

(Debt, \$1,648,000, outside debt limit.)

Amount of fund January 1, 1933		\$518,717 84
Received:		
Interest on bank deposits January 1, 1933		
to date	\$33 62	
Interest on investments January 1, 1933		
to date	21,197 50	
Revenue, etc., January 1, 1933 to date		11,835 65
	<hr/>	
		33,066 77
	<hr/>	
		\$551,784 61

BOYLSTON STREET SUBWAY.

(Debt, \$5,458,000, outside debt limit.)

Amount of fund January 1, 1933	.. . . .	\$238,412 28
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$83 02
Interest on investments January 1, 1933		
to date	.. . . .	7,476 25
Revenue, etc., January 1, 1933 to date	.. . . .	18,458 65
Premium on investments January 1, 1933		
to date	.. . . .	300 00
	<hr/>
		26,317 92
		<hr/>
		\$264,730 20

DORCHESTER TUNNEL.

(Debt, \$12,160,000, outside debt limit.)

Amount of fund January 1, 1933	.. . . .	\$990,450 30
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$293 26
Interest on investments January 1, 1933		
to date	.. . . .	35,832 50
Revenue, etc., January 1, 1933 to date	.. . . .	53,552 91
	<hr/>
		89,678 67
		<hr/>
		\$1,080,128 97

EAST BOSTON TUNNEL ALTERATIONS.

(Debt, \$3,900,000, outside debt limit.)

Amount of fund January 1, 1933	.. . . .	\$120,304 23
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$64 50
Interest on investments January 1, 1933		
to date	.. . . .	3,808 75
Revenue, etc., January 1, 1933 to date	.. . . .	12,876 94
	<hr/>
		16,750 19
		<hr/>
		\$137,054 42

EAST BOSTON TUNNEL EXTENSION.

(Debt, \$2,500,000, outside debt limit.)

Amount of fund January 1, 1933	.. . . .	\$324,084 64
Received:		
Interest on bank deposits January 1, 1933		
to date	\$117 71
Carried forward	\$117 71
		<hr/>
		\$324,084 64

TRANSIT DEPARTMENT.

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<i>Brought forward</i>	117 71	\$324,084 64
Interest on investments January 1, 1933		
to date	12,159 75	
Revenue, etc., January 1, 1933 to date	37,288 95	
	<hr/>	
		49,566 41
	<hr/>	
		\$373,651 05
Paid:		
Interest on investments purchased January 1, 1933 to date		
.		177 08
	<hr/>	
		\$373,473 97

ARLINGTON STATION.

(Debt, \$1,243,000, outside debt limit.)

Amount of fund January 1, 1933	. . . . .	\$11,804 95
Received:		
Interest on bank deposits January 1, 1933		
to date	86 70	
Interest on investments January 1, 1933		
to date	383 75	
	<hr/>	
		390 45
	<hr/>	
		\$12,195 40

DORCHESTER RAPID TRANSIT.

(Debt, \$10,910,000, outside debt limit.)

Amount of fund January 1, 1933	. . . . .	\$159,268 31
Received:		
Interest on bank deposits January 1, 1933		
to date	126 01	
Interest on investments January 1, 1933		
to date	3,997 50	
Revenue, etc., January 1, 1933 to date	56,448 58	
	<hr/>	
		60,572 09
	<hr/>	
		\$219,840 40

EAST BOSTON TUNNEL.

(Debt, \$3,334,000, outside debt limit.)

Amount of fund January 1, 1933	. . . . .	\$2,222,367 93
Received:		
Interest on bank deposits January 1, 1933		
to date	196 98	
Interest on investments January 1, 1933		
to date	84,150 94	
Revenue, etc., January 1, 1933 to date	4,820 00	
	<hr/>	
		89,167 92
	<hr/>	
		\$2,311,535 85

HYDE PARK STREET RAILWAY.

(Debt, \$322,000, outside debt limit.)

Amount of fund January 1, 1933	.. . . .	\$90,456 42
Received:		
Interest on bank deposits January 1, 1933		
to date	.. . . .	\$14 37
Interest on investments January 1, 1933		
to date	.. . . .	3,381 25
Appropriation for debt January 1, 1933		
to date	.. . . .	8,272 00
Appreciation of investments January 1, 1933 to date	.. . . .	60 63

		11,728 25

		\$102,184 67

Paid:

Interest on investments purchased January 1, 1933 to date	.. . . . .	13 61

		\$102,171 06

TREMONT STREET SUBWAY ALTERATIONS — ACTS 1924.

(Debt, \$115,000, outside debt limit.)

(No fund.)

EAST BOSTON TUNNEL ALTERATIONS — ACTS 1924.

(Debt, \$20,000, outside debt limit.)

(No fund.)

BOYLSTON STREET SUBWAY—ACTS 1930.

(Debt, \$4,935,000, outside debt limit.)

(No fund.)

TRAFFIC TUNNEL.

(Debt, \$15,200,000, outside debt limit.)

(No fund.)

TRAFFIC TUNNEL—SERIES B.

(Debt, \$2,000,000, outside debt limit.)

(No fund.)

RENTAL BILLS RENDERED TO THE BOSTON ELEVATED RAILWAY COMPANY.

The following is a statement of the bills rendered for rental of the various tunnels and subways:

TREMONT STREET SUBWAY.

March 31, 1933:				
Net cost of subway	.	.	\$4,213,180	52
Rental for one quarter	.	.		\$47,398 28
Alterations: Net cost	.	.	242,673	93
Rental for one quarter	.	.		2,730 08
June 30, 1933:				
Net cost of subway	.	.	4,213,609	76
Rental for one quarter	.	.		47,403 11
Alterations: Net cost	.	.	242,673	93
Rental for one quarter	.	.		2,730 08
September 30, 1933:				
Net cost of subway	.	.	4,215,422	17
Rental for one quarter	.	.		47,423 50
Alterations: Net cost	.	.	242,673	93
Rental for one quarter	.	.		2,730 08
December 31, 1933:				
Net cost of subway	.	.	4,215,464	11
Rental for one quarter	.	.		47,423 97
Alterations: Net cost	.	.	242,673	93
Rental for one quarter	.	.		2,730 08
				<u>\$200,569 18</u>

DORCHESTER RAPID TRANSIT.

March 31, 1933:				
Net cost of premises	.	.	\$10,788,202	96
Rental for one quarter	.	.		\$121,367 28
June 30, 1933:				
Net cost of premises	.	.	10,789,860	76
Rental for one quarter	.	.		121,385 93
September 30, 1933:				
Net cost of premises	.	.	10,801,109	76
Rental for one quarter	.	.		121,512 49
December 31, 1933:				
Net cost of premises	.	.	10,909,071	17
Rental for one quarter	.	.		122,727 05
				<u>\$486,992 75</u>

CAMBRIDGE CONNECTION.

March 31, 1933:				
Net cost of connection	.	.	\$1,653,248	84
Rental for one quarter	.	.		\$18,599 05
June 30, 1933:				
Net cost of connection	.	.	1,653,270	99
Rental for one quarter	.	.		18,599 30
September 30, 1933:				
Net cost of connection	.	.	1,653,302	15
Rental for one quarter	.	.		18,599 65
December 31, 1933:				
Net cost of connection	.	.	1,653,270	99
Rental for one quarter	.	.		18,599 30
				<u>\$74,397 30</u>

WASHINGTON STREET TUNNEL.

March 31, 1933:	Net cost of tunnel	7,947,250 65	
	Rental for one quarter		\$89,406 57
June 30, 1933:	Net cost of tunnel	7,947,250 65	
	Rental for one quarter		89,406 57
September 30, 1933:	Net cost of tunnel	7,947,250 65	
	Rental for one quarter		89,406 57
December 31, 1933:	Net cost of tunnel	7,947,250 65	
	Rental for one quarter		89,406 57
			<u>\$357,626 28</u>

EAST BOSTON TUNNEL.

March 31, 1933:	Net cost of tunnel	\$3,402,681 10	
	Rental for one quarter		\$38,280 16
June 30, 1933:	Net cost of tunnel	3,402,748 40	
	Rental for one quarter		38,280 92
September 30, 1933:	Net cost of tunnel	3,403,173 08	
	Rental for one quarter		38,285 70
December 31, 1933:	Net cost of tunnel	3,403,811 01	
	Rental for one quarter		38,292 88
			<u>\$153,139 66</u>

BOYLSTON STREET SUBWAY.

March 31, 1933:	Net cost of subway	\$5,318,856 04	
	Rental for one quarter		\$59,837 13
June 30, 1933:	Net cost of subway	5,318,860 72	
	Rental for one quarter		59,837 18
September 30, 1933:	Net cost of subway	5,322,492 13	
	Rental for one quarter		59,878 04
December 31, 1933:	Net cost of subway	5,326,438 08	
	Rental for one quarter		58,742 53
			<u>\$238,294 88</u>

EAST BOSTON TUNNEL EXTENSION.

March 31, 1933:	Net cost of extension	\$2,344,896 97	
	Rental for one quarter		\$26,380 09
June 30, 1933:	Net cost of extension	2,345,338 93	
	Rental for one quarter		26,385 06
September 30, 1933:	Net cost of extension	2,345,338 93	
	Rental for one quarter		26,385 06
December 31, 1933:	Net cost of extension	2,345,338 93	
	Rental for one quarter		26,385 06
			<u>\$105,535 27</u>

DORCHESTER TUNNEL.

March 31, 1933:				
Net cost of tunnel	.	.	\$12,204,258	94
Rental for one quarter	.	.		\$137,297 91
June 30, 1933:				
Net cost of tunnel	.	.	12,204,258	94
Rental for one quarter	.	.		137,297 91
September 30, 1933:				
Net cost of tunnel	.	.	12,204,258	94
Rental for one quarter	.	.		137,297 91
December 31, 1933:				
Net cost of tunnel	.	.	12,204,321	33
Rental for one quarter	.	.		137,298 62
				<u>\$549,192 35</u>

ARLINGTON STATION.

March 31, 1933:				
Net cost of station	.	.	\$1,225,563	83
Rental for one quarter	.	.		\$13,787 59
June 30, 1933:				
Net cost of station	.	.	1,227,307	72
Rental for one quarter	.	.		13,807 21
September 30, 1933:				
Net cost of station	.	.	1,227,328	22
Rental for one quarter	.	.		13,807 44
December 31, 1933:				
Net cost of station	.	.	1,227,371	06
Rental for one quarter	.	.		13,807 93
				<u>\$55,210 17</u>

EAST BOSTON TUNNEL ALTERATIONS.

March 31, 1933:				
Net cost of alterations	.	.	\$3,829,278	26
Rental for one quarter	.	.		\$43,079 38
June 30, 1933:				
Net cost of alterations	.	.	3,830,840	06
Rental for one quarter	.	.		43,096 95
September 30, 1933:				
Net cost of alterations	.	.	3,830,927	35
Rental for one quarter	.	.		43,097 93
December 31, 1933:				
Net cost of alterations	.	.	3,830,927	35
Rental for one quarter	.	.		43,097 93
				<u>\$172,372 19</u>

HYDE PARK STREET RAILWAY.

March 31, 1933:				
Net cost of premises	.	.	\$231,099	45
Rental for one quarter	.	.		\$2,599 87
June 30, 1933:				
Net cost of premises	.	.	231,099	45
Rental for one quarter	.	.		2,599 87
September 30, 1933:				
Net cost of premises	.	.	231,099	45
Rental for one quarter	.	.		2,599 87
December 31, 1933:				
Net cost of premises	.	.	231,099	45
Rental for one quarter	.	.		2,599 87
				<u>\$10,399 48</u>

BOYLSTON STREET SUBWAY—ACTS 1930.

Based on annual interest requirements	\$201,098 04
One-half of one per cent of net cost, (\$4,896,424.43)	24,482 12
	<u>\$225,580 16</u>

Rental for 8 months, 8 days, from October 24, 1932 to June 30, 1933	<u>\$155,399 66</u>
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TOTALS.

Tremont Street Subway	\$200,569 18
Dorchester Rapid Transit	486,992 75
Cambridge Connection	74,397 30
Washington Street Tunnel	357,626 28
East Boston Tunnel	153,139 66
Boylston Street Subway	238,294 88
East Boston Tunnel Extension	105,535 27
Dorchester Tunnel	549,192 35
Arlington Station	55,210 17
East Boston Tunnel Alterations	172,372 19
Hyde Park Street Railway	10,399 48
Boylston Street Subway—Acts 1930	<u>155,399 66</u>
	<u>\$2,559,129 17</u>

STATEMENT OF EXPENSES.

The following is a classified statement of the expenses of the Department for the year ending December 31, 1933:

BOSTON TUNNEL AND SUBWAY.

Engineering Expenses:	
Skilled Service	<u>\$66 67</u>

CAMBRIDGE CONNECTION.

SECTION 2.

Engineering Expenses:	
Skilled Service	\$93 11
Construction Expenses:	
Labor	<u>48 00</u>

\$141 11

DORCHESTER TUNNEL.

SECTION C.

Engineering Expenses:	
Skilled Service	<i>Cr. \$21 82</i>
Construction Expenses:	
Construction	<i>Cr. \$63 15</i>
Labor	<i>Cr. 70 37</i>
	<u>Cr. \$133 52</u>
Tools	8 00
	<u>Cr. 125 52</u>
	<i>Cr. \$147 34</i>

BOYLSTON STREET SUBWAY.

Engineering Expenses:

Huntington Avenue Subway —	
Acts 1932	\$1 28
Acts 1933	4,719 60
Skilled Service	5 53
	<hr/>
	\$4,726 41

SECTION 1.

Construction Expenses:

Construction Expenses: 924 00
Labor

SECTION 2.

Sub-Station:

Skilled Service 93 50

SECTION 4.

Construction Expenses:

Construction	.	.	.	.	\$127 09
Field Supplies	.	.	.	.	34 43
Labor	.	.	.	.	2,611 65
Tools	.	.	.	.	101 05
					<u>2,874 22</u>
					<u>\$8,618 13</u>

TREMONT STREET SUBWAY ALTERATIONS — ACTS 1924.

Engineering Expenses:

Engineering Expenses: Stationery — Supplies \$2 20

Adams Station — Altering Shelter:

Boylston Station:

Construction	. . . . .	\$150 57
Field Supplies	. . . . .	12 63
Labor	. . . . .	2,267 10
Skilled Service	. . . . .	3 91
Tools	. . . . .	40 95
		<hr/>
		2,475 16
		<hr/>
		\$1,437 83
		<hr/>
		Cr. \$874 93

EAST BOSTON TUNNEL ALTERATIONS — ACTS 1924.

Construction Expenses:

Construction Expenses.
Labor \$514.97

Lab 31 : . . . Atlantic Station:

Atlantic Station.	
Skilled Service	\$592 76
Labor	302 10
Tools	28 00

Carried forward \$1,437.83

<i>Brought forward</i>	.	.	.	.	.	\$1,437 83
Court Street Pipe Crossing:						
Construction	.	.	.	Cr.	918 89	
Field Supplies	.	.	.	Cr.	357 43	
Skilled Service	.	.	.	Cr.	580 36	
Stationery — Supplies	.	.	.	Cr.	29 51	
Teaming	.	.	.	Cr.	367 06	
Tools	.	.	.	Cr.	152 55	
					<u>Cr. 2,405 80</u>	
						<u>Cr. \$967 97</u>

EAST BOSTON TUNNEL EXTENSION.

SECTION G.

Engineering Expenses:						
Stationery — Supplies	.	.	.	.	.	\$1 00
Construction Expenses:						
Construction	.	.	.	Cr.	168 22	
Labor	.	.	.	Cr.	980 67	
Tools	.	.	.	Cr.	13 55	
					<u>Cr. 1,162 44</u>	
						<u>\$1,163 44</u>

ARLINGTON STATION.

Engineering Expenses:						
Stationery — Supplies	.	.	.	.	.	\$5 85
Construction Expenses:						
Construction	.	.	.	Cr.	218 35	
Field Supplies	.	.	.	Cr.	52 57	
Labor	.	.	.	Cr.	3,265 68	
Tools	.	.	.	Cr.	106 54	
					<u>Cr. 3,643 14</u>	
						<u>\$3,648 99</u>

DORCHESTER RAPID TRANSIT.

Engineering Expenses:						
Skilled Service	.	.	.	Cr.	279 82	
Stationery — Supplies	.	.	.	Cr.	7 80	
					<u>Cr. 287 62</u>	

SECTION 1.

Engineering Expenses:						
Property Damages —						
Takings	.	.	.	Cr.	6 00	
Skilled Service	.	.	.	Cr.	207 56	
					<u>Cr. 213 56</u>	
Construction Expenses:						
Construction	.	.	.	Cr.	15,470 34	
Stations:						
Columbia — Tools and Equipment	.	.	.	Cr.	14 86	
Savin — Tools and Equipment.	.	.	.	Cr.	14 86	
Bridges:						
Bay Street — Skilled Service	.	.	.	Cr.	19 66	
					<u>Cr. 15,733 28</u>	

SECTION 2.

Engineering Expenses:						
Skilled Service	.	.	.	Cr.	193 77	
Stations: Field's Corner — Enclosed						
Area:						
Skilled Service	.	.	.	Cr.	38 96	
<i>Carried forward</i>	.	.	.	Cr.	232 73	\$16,020 90

<i>Brought forward</i>	. . .	\$232 73	\$16,020 90
Fields Corner Station:			
Stationery — Supplies		\$0 60	
Tools . . .		14 86	
		<u>15 46</u>	<u>248 19</u>

SECTION 3.

Engineering Expenses:			
Professional Advice		\$13,207 00	
Skilled Service		1,893 51	
Stationery — Supplies		1 58	
Stenographers . . .		656 88	
		<u>\$15,758 97</u>	

Construction Expenses:			
Labor . . .		\$43 19	
Field Supplies . . .		10 60	
		<u>53 79</u>	

Stations: Shawmut:			
C. and R. Construction Company, (Contract 805) . . .		85,776 87	

Miscellaneous Expenses:			
Construction . . .		\$14 81	
Field Supplies . . .		7 88	
Labor . . .		1,548 78	
Skilled Service . . .		30 48	
Tools . . .		2 00	
		<u>1,603 95</u>	
			103,193 58

SECTION 4.

Bridges: Adams Street:			
Labor . . .		\$26 88	

Stations: Ashmont:			
Labor . . .		\$14 40	
Stationery — Supplies		50	
		<u>14 90</u>	

Ashmont Signal Tower:			
Construction . . .		\$16 00	
Skilled Service . . .		38 96	
		<u>54 96</u>	

Miscellaneous Expenses:			
Construction . . .		\$11 34	
Tools . . .		1 76	
		<u>13 10</u>	
			109 84

SECTION 5 C.

Stations: Mattapan:			
Advertising . . .		\$10 00	
Construction . . .		1,935 00	
Labor . . .		22 60	
Skilled Service . . .		1,048 94	
Stationery — Supplies		2 25	
		<u>\$3,018 79</u>	

Miscellaneous Expenses:			
Skilled Service . . .		5 66	
		<u>3,024 45</u>	
			<u>\$122,596 96</u>

TRAFFIC TUNNEL.

General Expenses:	
Chief Clerk . . .	\$3,563 96
Clerks and Stenographers . . .	4,818 39
Commissioners . . .	21,500 00
Conveyancers . . .	3,563 96
Office Boy . . .	662 40
Secretary . . .	5,791 31
Office — Furniture . . .	11 98
Lighting . . .	393 27
Printing . . .	759 90
Rental . . .	8,000 04
Repairs . . .	90 43
Stationery—	
Supplies . . .	686 25
Telephone—	
Telegraph . . .	2,370 70
Miscellaneous Bills —	
not subject to apportionment:	
Stationery — Supplies — Office . . .	328 32
	—————
	\$52,540 91

Transfers:	
To Boylston Street	
Subway — Chap. 394 — Acts 1930 . . .	\$913 98
Traffic Tunnel —	
Series B . . .	14,464 05
	—————
	15,378 03
	—————
	\$37,162 88

Engineering and Miscellaneous Expenses:	
Administration Building . . .	\$21,436 74
Advertising . . .	1,325 59
Autos . . .	3,251 90
Blower Exhauster Fans . . .	87,380 39
Borings . . .	131 25
Chief Engineer . . .	5,433 75
Clerks . . .	6,642 65
Construction . . .	32,784 15
Electric Power Equipment . . .	35,666 67
Field Supplies . . .	30,911 92
Fuel . . .	356 24
Garage — East Boston . . .	5,108 38
Inspection . . .	877 68
Instruments . . .	457 14
Labor . . .	107,394 10
Lighting . . .	5,817 04
Lighting — Equipment . . .	26,787 81
Paving — Roadway . . .	91,111 51
Pensioned Employees . . .	1,462 50
Pipe Rail Fence . . .	3,170 77
Printing . . .	804 79
Professional Advice . . .	26,985 28
Property Damages — Takings . . .	259,054 65
Property Repairs . . .	1,070 72
Pump Equipment . . .	5,552 97
Rental . . .	5,533 34
Rental — Yard . . .	3,492 92
	—————
Carried forward . . .	\$770,002 85
	—————
	\$37,162 88

<i>Brought forward</i>			\$770,002	85	\$37,162	88
Repairs			134	84		
Signal — Connection Equipment			10,984	60		
Skilled Service			68,327	43		
Stationery — Supplies			2,141	78		
Stenographers			1,920	54		
Substation Equipment			45,601	54		
Teaming			3,254	52		
Telephone — Telegraph			539	79		
Tools			109,335	77		
Ventilation Building:						
Boston			148,451	65		
East Boston			91,203	95		
Equipment			33,078	34		
					\$1,284,977	60

Transfers — Property Damages —

Takings:

Haymarket	Square						
Widening			\$150	00			
Traffic	Tunnel —						
Series B			6,631	52			
					6,781	52	
						1,278,196	08

SECTION A.

Silas Mason Co., Inc. (Contract V-8), \$109,182 90

Miscellaneous Expenses:

Construction		\$4,890	51				
Field Office — Meridian Street		336	05				
Field Supplies		56	54				
Fuel		51	70				
Labor		7,453	35				
Skilled Service		14,118	24				
Stationery — Supplies		300	32				
Teaming		131	92				
Tools		935	15				
Ventilation Shaft —							
East Boston		15,959	88				
Water Pipes		256	91				
				44,490	57		
						153,673	47

SECTION B.

C. and R. Construction Co. (Contract V-11), \$12,184 76

Miscellaneous Expenses:

Construction		\$1,190	37				
Field Office — North Street		56	60				
Fuel		51	70				
Labor		2,041	31				
Lighting		33	60				
Paving		321	66				
Skilled Service		788	96				
Stationery — Supplies		17	51				
Teaming		50	00				
<i>Carried forward</i>		\$4,551	71	\$12,184	76	\$1,469,032	43

Brought forward . . .	\$4,551 71	\$12,184 76	\$1,469,032 43
Tools . . .	200 90		
Ventilation Shaft —			
Boston . . .	17,368 57		
	<hr/>	22,121 18	<hr/>
			34,305 94

SECTION C.

Miscellaneous Expenses:

Advertising . . .	\$133 60
Construction . . .	5,213 77
Fuel . . .	51 70
Labor . . .	2,073 26
Paving . . .	23,755 25
Skilled Service . . .	1,259 75
Stationery — Supplies	25 50
	<hr/>
	32,512 83

SECTION D.

A. R. Doyle, Inc. (Contract V-66) . . . \$6,377 40

Miscellaneous Expenses:

Advertising . . .	\$217 90
Construction . . .	3,059 37
Fuel . . .	51 70
Inspection . . .	15 00
Labor . . .	8,535 76
Skilled Service . . .	6,988 21
Stationery—Supplies,	26 37
Teaming . . .	2,137 62
	<hr/>
	21,031 93
	<hr/>
	27,409 33

Interest.

Interest	561,623 75
	<hr/>
	\$2,124,884 28

TRAFFIC TUNNEL — SERIES B.

Proportion General Expenses transferred from Traffic Tunnel . . .	\$14,464 05
Miscellaneous Bills — not subject to apportionment:	
Stationery — Supplies — Office . . .	1,598 82

\$16,062 87

Engineering and Miscellaneous Expenses:

Advertising . . .	\$568 30
Autos . . .	379 85
Chief Engineer . . .	2,231 25
Clerks . . .	1,922 37
Construction . . .	13 00
Field Supplies . . .	3 40
Instruments . . .	75
Labor . . .	3,464 89
Lighting . . .	100 24
Printing . . .	213 49
Professional Advice . . .	28,349 04
Property Damages —	
Takings . . .	553,152 60
Property Repairs . . .	159 59
Rental . . .	2,333 36
	<hr/>
Carried forward . . .	\$592,892 13
	<hr/>
	\$16,062 87

<i>Brought forward</i>		\$592,892 13		\$16,062 87
Rental — Yard		1,472 92		
Repairs		38 40		
Skilled Service — transferred from Haymarket Square		13,403 25		
Widening				
Skilled Service — transferred from Traffic Tunnel		6,631 52		
Stationery—Supplies,		821 84		
Stenographers		766 38		
Telephone — Telegraph		215 72		
		<hr/>		
			616,242 16	
			<hr/>	
				\$632,305 03

BOYLSTON STREET SUBWAY — CHAPTER 394 — ACTS 1930.

Proportion General Expenses transferred from Traffic Tunnel		\$913 98
Miscellaneous Bills — not subject to apportionment		55 00
		<hr/>
		\$968 98

Engineering and Miscellaneous Expenses:

Autos		\$51 30
Chief Engineer		122 50
Clerks		411 71
Fuel		20 68
Inspection		36 34
Labor		23,831 40
Lighting		698 06
Professional Advice		3,290 34
Rental		617 50
Skilled Service		4,191 06
Stationery—Supplies,		
Engineers		68 05
Stenographers		122 77
Teaming		16,471 62
Telephone — Telegraph		14 14
Underpinning		2,094 13
Water Pipes		20,000 35
		<hr/>
		\$72,041 95

Credits:

Construction		\$4,157 41
Furniture		7 50
Paving		13,779 81
Field Supplies		26,506 39
Tools		103,848 09
		<hr/>
		148,299 20

Interest		<hr/>	Cr. 76,257 25
			63,787 50
		<hr/>	Cr. \$11,500 77

EAST BOSTON TUNNEL ALTERATIONS.

Engineering and Miscellaneous Expenses:

Construction		\$142 18
Field Supplies		36 50
		<hr/>
<i>Carried forward</i>		\$178 68

<i>Brought forward</i>		\$178 68
Labor		1,818 29
Stationery—Supplies, Engineers		45
Tools		56 34
		<hr/>
		\$2,053 76

HYDE PARK STREET RAILWAY.

Engineering and Miscellaneous Expenses:		
Property Damages—Takings		<u>Cr. \$75 00</u>

Increase:

Boston Tunnel and Subway		\$66 67
Cambridge Connection		141 11
Boylston Street Subway		8,618 13
East Boston Tunnel Extension		1,163 44
Arlington Station		3,648 99
Dorchester Rapid Transit		122,596 96
Traffic Tunnel		2,124,884 28
Traffic Tunnel — Series B		632,305 03
East Boston Tunnel Alterations,		2,053 76
		<hr/>
		\$2,895,478 37

Decrease:

Dorchester Tunnel		\$147 34
Tremont Street Subway Alterations — Acts 1924		874 93
East Boston Tunnel Alterations—Acts 1924		967 97
Boylston Street Subway—Chapter 394, Acts 1930		11,500 77
Hyde Park Street Railway		75 00
		<hr/>
		13,566 01
		<hr/>
		\$2,881,912 36

SUMMARY.

	From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
Subway — Subway Commission	\$14,131 16		\$14,131 16
Part of General Expenses	117,550 71		117,550 71
Engineering and miscellaneous	407,475 48		407,475 48
Section One	239,407 12		239,407 12
Two	363,605 50		363,605 50
Three	300,639 36		300,639 36
Three and one-half	9,355 70		9,355 70
Four	472,147 31		472,147 31
Five	387,411 49		387,411 49
Six	327,541 86		327,541 86
Seven	231,504 27		231,504 27
Eight	95,902 06		95,902 06
Eight and one-half	76,639 47		76,639 47
Nine	299,452 07		299,452 07
Ten	254,497 88		254,497 88
<i>Carried forward</i>	\$3,597,261 44		\$3,597,261 44

TRANSIT DEPARTMENT.

21

	From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
<i>Brought forward</i>	\$3,597,261 44		\$3,597,261 44
Section Eleven	270,310 57		270,310 57
Interest	258,575 60		258,575 60
	<u>\$4,126,147 61</u>		<u>\$4,126,147 61</u>
Transfer to Alterations, see 11th report	4 95		4 95
	<u>\$4,126,142 66</u>		<u>\$4,126,142 66</u>
Alterations — Part of Gen- eral Expenses	\$28,945 53		\$28,945 53
Section Three	2,568 26		2,568 26
Four	163 42		163 42
Five	30,233 01		30,233 01
Seven	178,516 16		178,516 16
Nine	3 00		3 00
Ten	534 04		534 04
Interest	1,905 56		1,905 56
Transfer from subway, see 11th report	4 95		4 95
	<u>\$242,873 93</u>		<u>\$242,873 93</u>
Charlestown Bridge:			
Total	<u>\$1,570,197 98</u>		<u>\$1,570,197 98</u>
Investigation of conges- tion of traffic, etc.	<u>\$3,015 92</u>		<u>\$3,015 92</u>
East Boston Tunnel — Part of General Ex- penses	\$161,134 78		\$161,134 78
Engineering and Miscel- laneous	199,688 73		199,688 73
Section A	98,869 09		98,869 09
B	1,490,342 60		1,490,342 60
C	508,202 77		508,202 77
D	246,569 26		246,569 26
E	188,307 72		188,307 72
F	243,763 23		243,763 23
Interest	248,156 88		248,156 88
	<u>\$3,385,035 06</u>		<u>\$3,385,035 06</u>
Boston Tunnel and Sub- way — Part of Gen- eral Expenses	\$226,547 21		\$226,547 21
Engineering and Miscel- laneous	420,231 16	\$66 67	420,297 83
Section One	815,591 24		815,591 24
Two	614,183 29		614,183 29
Three	684,221 19		684,221 19
Four	1,205,331 83		1,205,331 83
Five	1,080,155 50		1,080,155 50
Six	351,824 55		351,824 55
Seven	139,723 14		139,723 14
<i>Carried forward</i>	\$5,537,809 11	\$66 67	\$5,537,875 78

		From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
<i>Brought forward</i>		\$5,537,809 11	\$66 67	\$5,537,875 78
Section Eight		619,109 87		619,109 87
Nine		679,150 23		679,150 23
Ten		142,835 42		142,835 42
Eleven		345,493 91		345,493 91
Twelve		45,417 52		45,417 52
Interest		648,179 81		648,179 81
		<u>\$8,017,995 87</u>	<u>\$66 67</u>	<u>\$8,018,062 54</u>
Cambridge Connection —				
Part of General Ex- penses		\$67,261 25		\$67,261 25
Engineering and Miscel- laneous		258,911 30		258,911 30
Section One		590,280 64		590,280 64
Two		653,237 57	\$141 11	653,378 68
Interest		76,722 00		76,722 00
		<u>\$1,646,412 76</u>	<u>\$141 11</u>	<u>\$1,646,553 87</u>
Dorchester Tunnel — Part of General Expenses,		\$197,392 47		\$197,392 47
Engineering and Miscel- laneous		833,284 86		833,284 86
Section A		409,836 77		409,836 77
B		885,488 41		885,488 41
C		460,379 33	<i>Cr. \$147 34</i>	460,231 99
D		1,131,501 48		1,131,501 48
E		2,368,681 67		2,368,681 67
F		868,825 20		868,825 20
G		616,831 30		616,831 30
H		894,569 66		894,569 66
J		981,409 03		981,409 03
K		1,352,074 44		1,352,074 44
Interest		1,312,320 20		1,312,320 20
		<u>\$12,312,594 82</u>	<i>Cr. \$147 34</i>	<u>\$12,312,447 48</u>
Boylston Street Subway — Part of General Expenses		\$104,155 53		\$104,155 53
Engineering and Miscel- laneous		258,990 15		263,716 56
Section One		765,253 99	\$4,726 41	766,177 99
Two		1,262,596 55	924 00	1,262,690 05
Three		585,564 58	93 50	585,564 58
Four		1,459,155 99	2,874 22	1,462,030 21
Five		729,141 17		729,141 17
Interest		320,194 59		320,194 59
		<u>\$5,485,052 55</u>	<u>\$8,618 13</u>	<u>\$5,493,670 68</u>
Tremont Street Subway — Alterations — Acts 1924 — Part of General Expenses		\$1,093 59		\$1,093 59
Engineering and Miscel- laneous		1,043 76	\$2 20	1,045 96
<i>Carried forward</i>		<u>\$2,137 35</u>	<u>\$2 20</u>	<u>\$2,139 55</u>

	From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
<i>Brought forward</i> . . .	\$2,137 35	\$2 20	\$2,139 55
Adams Station . . .	13,487 76	Cr. 3,352 29	10,135 47
Boylston Station . . .	552 70	2,475 16	3,027 86
Brattle Street — East- erly Platform . . .	7,723 72		7,723 72
Hanover Street . . .	49 10		49 10
Haymarket Station . . .	15,161 01		15,161 01
North Station Sub- Station . . .	44,945 23		44,945 23
Park Street Station:			
North Platform . . .	4,899 29		4,899 29
Column Changes . . .	16,972 77		16,972 77
General . . .	371 31		371 31
Scollay Station . . .	788 26		788 26
Scollay Square Changes — Cambridge a n d Court Streets Widening . . .	7,311 84		7,311 84
	<u>\$114,400 34</u>	<u>Cr. \$874 93</u>	<u>\$113,525 41</u>
East Boston Tunnel Al- terations — Acts 1924			
Engineering a n d Miscellaneous . . .	\$885 24	\$514 97	\$1,400 21
Atlantic Station . . .	6,089 82	922 86	7,012 68
Court Street Pipe Crossing . . .	2,405 80	Cr. 2,405 80	—
East Boston Tunnel . . .	5,701 86		5,701 86
Scollay Station . . .	68 01		68 01
Scollay Square Changes — Cambridge a n d Court Streets Widening . . .	4,656 57		4,656 57
	<u>\$19,807 30</u>	<u>Cr. \$967 97</u>	<u>\$18,839 33</u>
East Boston Tunnel Ex- tension — Part of Gen- eral Expenses	\$38,383 04		\$38,383 04
Engineering and Misce- lanous . . .	976,311 43		976,311 43
Section G . . .	336,850 84	Cr. 1,163 44	338,014 28
H . . .	674,805 83		674,805 83
J . . .	135,736 74		135,736 74
Interest . . .	224,138 91		224,138 91
	<u>\$2,386,226 79</u>	<u>Cr. 1,163 44</u>	<u>\$2,387,390 23</u>
Arlington Station — Part of General Expenses, Engineering and Misce- lanous . . .	\$41,313 26		\$41,313 26
Construction . . .	72,966 00	\$3,648 99	76,614 99
Extensions . . .	586,146 79		586,146 79
Interest . . .	483,005 17		483,005 17
	<u>55,738 68</u>		<u>55,738 68</u>
	<u>\$1,239,169 90</u>	<u>\$3,648 99</u>	<u>\$1,242,818 89</u>

	From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
Dorchester Rapid Transit— Part of General Ex- penses	\$210,069 67		\$210,069 67
Engineering and Mis- cellaneous	268,458 83	\$287 62	268,746 45
Section One	2,665,225 06	15,733 28	2,680,958 34
Two	1,693,600 73	248 19	1,693,848 92
Three	1,587,519 33	103,193 58	1,690,712 91
Four	1,742,470 85	109 84	1,742,580 69
Five	2,085,433 25	3,024 45	2,088,457 70
Interest	643,815 26		643,815 26
	<u>\$10,896,592 98</u>	<u>\$122,596 96</u>	<u>\$11,019,189 94</u>
Traffic Tunnel—Part of General Expenses	\$129,651 45	\$37,162 88	\$166,814 33
Engineering and Mis- cellaneous	6,228,939 16	1,278,196 08	7,507,135 24
Section A	5,708,289 71	153,673 47	5,861,963 18
B	283,385 72	34,305 94	317,691 66
C	31,375 44	32,512 83	63,888 27
D	1,081 04	27,409 33	28,490 37
Haymarket Square Widening	6,631 52		6,631 52
Interest	547,006 25	561,623 75	1,108,630 00
	<u>\$12,936,360 29</u>	<u>\$2,124,884 28</u>	<u>\$15,061,244 57</u>
Traffic Tunnel—Series B— Part of General Ex- penses		\$16,062 87	\$16,062 87
Engineering and Mis- cellaneous		616,242 16	616,242 16
	<u>\$632,305 03</u>	<u>\$632,305 03</u>	
Boylston Street Sub- way — Chapter 394 Acts 1930—Part of General Expenses	\$56,544 82	\$968 98	\$57,513 80
Engineering and Mis- cellaneous	316,342 83	Cr. 76,257 25	240,085 58
Construction	4,406,480 64		4,406,480 64
Interest	145,275 00	63,787 50	209,062 50
	<u>\$4,924,643 29</u>	<u>Cr. \$11,500 77</u>	<u>\$4,913,142 52</u>
East Boston Tunnel Alter- ations—Part of Gen- eral Expenses	\$75,407 79		\$75,407 79
Engineering and Mis- cellaneous	172,619 03	\$2,053 76	174,672 79
Construction	3,412,629 01		3,412,629 01
Interest	168,217 76		168,217 76
	<u>\$3,828,873 59</u>	<u>\$2,053 76</u>	<u>\$3,830,927 35</u>

	From beginning of work to Dec. 31, 1932.	Jan. 1, 1933, to Dec. 31, 1933.	Total.
Hyde Park Street Railway—Part of General Expenses	\$2,195 04		\$2,195 04
Engineering and Miscellaneous	297,264 78 Cr.	\$75 00	297,189 78
	<u>\$299,459 82</u> Cr.	<u>\$75 00</u>	<u>\$299,384 82</u>
Chapter 78—Resolves of 1913	<u>\$389 14</u>		<u>\$389 14</u>
Chapter 84—Resolves of 1913	<u>\$636 58</u>		<u>\$636 58</u>
Dorchester Tunnel Extension	<u>\$520 19</u>		<u>\$520 19</u>
Grand Totals	<u>\$73,436,401 76</u>	<u>\$2,881,912 36</u>	<u>\$76,318,314 12</u>

The report of the Chief Engineer giving the work in detail follows.

THOMAS F. SULLIVAN,
NATHAN A. HELLER,
ARTHUR B. CORBETT,
Commissioners.

REPORT OF THE CHIEF ENGINEER.

December 31, 1933.

THOMAS F. SULLIVAN, NATHAN A. HELLER AND ARTHUR B. CORBETT, *Commissioners, City of Boston Transit Department:*

GENTLEMEN,— I herewith submit a report for the year ending December 31, 1933.

The construction work of the Department during the year of 1933 has been chiefly on the Traffic Tunnel in Boston and East Boston. Much has been detail work such as installing electrical equipment in the tunnel and buildings for operating the fans, pumps, signals, and for lighting. Altogether there have been plans and specifications prepared for more than forty-two contracts during the past year.

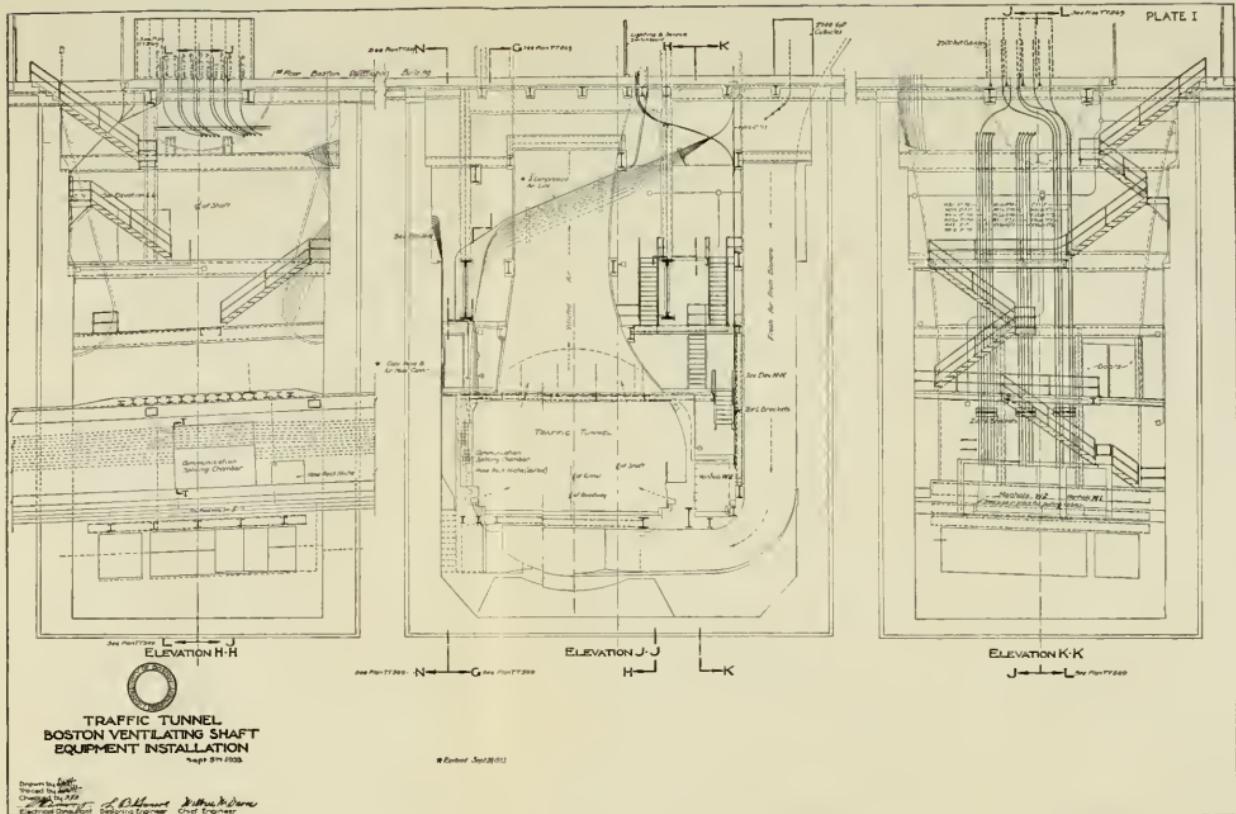
The bore for the tunnel and the concrete lining was substantially completed just before the beginning of this year and that construction work is described in previous annual reports.

During January and February of this year the work of Silas Mason Company, contractor for building the main tunnel, consisted chiefly of grouting inside of the steel lining to dry up damp spots appearing in the concrete lining at various locations and on February 14 the certificate of completion of the above contract was written.

VENTILATION AND THE EQUIPMENT.

On the East Boston side of the harbor directly over the tunnel and connecting the tunnel with the Ventilation Building on Liverpool street is a concrete shaft 31 feet long and 48 feet wide, inside dimensions, which width is 18 feet wider than the tunnel. Through this vertical shaft run the air ducts connecting respectively the fresh air and the exhaust air ducts in the tunnel with the intake and exhaust fans located on the various floors in the Ventilation Building.

On the Boston side of the harbor is a similar shaft containing the ducts which connect the ducts of the tunnel with the fans in the Ventilation Building on North street.



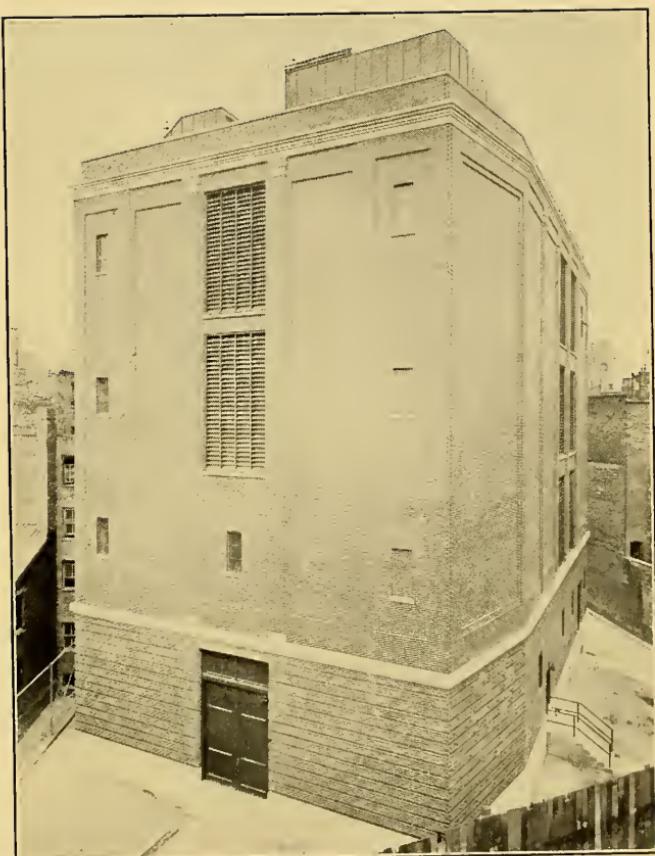
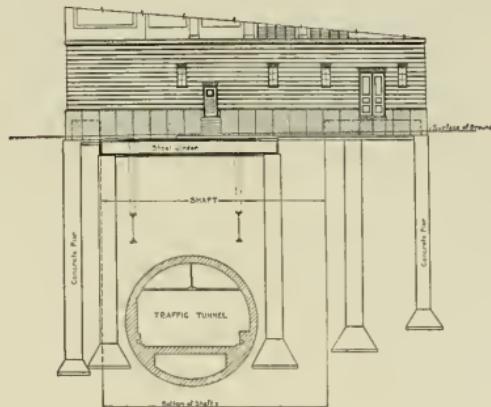
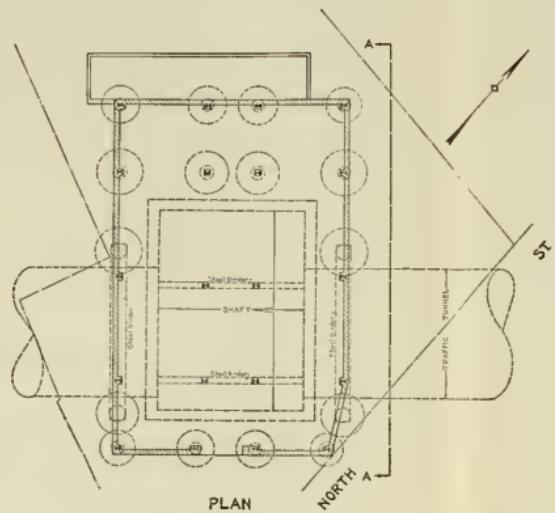


PLATE II.—BOSTON VENTILATION BUILDING.
VIEW TAKEN FROM NORTH STREET.




TRAFFIC TUNNEL
BOSTON VENTILATION BUILDING
FOUNDATION PIERS

The construction of the ducts in these shafts was let to the Matthew Cummings Company under two contracts; one for each shaft together with the incidental work such as furnishing and installing structural steel for supporting the ducts, furnishing and installing iron stairways, etc. The walls of the ducts are of gunite reinforced with heavy galvanized wire cloth, the same construction as the ducts in the Ventilation Buildings. The ducts in these shafts were completed during the year.

Plate I shows drawings of vertical sections through the Boston Ventilation Shaft.

The Annual Report ending December 31, 1932, described the Ventilation Building over the tunnel on the East Boston side located on Liverpool street. The work of the first period of the East Boston Building was completed in February, 1933. In January of this year work was begun by the Rugo Construction Company of constructing a similar building on the Boston side of the harbor on North street. This building, like the East Boston Building, was let to be constructed in two periods; the first for the construction of the major portion of the building, the second for construction of that part consisting of partitions, completion of floors, installation of doors, painting, etc., which work could not be done until after the installation of fans, ducts and electrical equipment by other contractors.

Plate II is a view of the Boston Ventilation Building taken from North street.

It was necessary to carry some of the foundations of that part of the Boston Ventilation Building which is outside of the part resting on the ventilation shaft to a depth nearly to that of the bottom of the tunnel, or about 57 feet below the surface of the ground, partly on account of the nature of the soil and partly because the soil had been disturbed during the construction of the tunnel and shaft. These concrete piers were built by the caisson method. They are twenty in number and 3 and 4 feet in diameter, flaring at the bottom.

Plate III is a plan and cross section showing the foundations of the Boston Ventilation Building relative to the tunnel.

The work of the first period of the construction of this Boston Ventilation Building is completed and the second period is now in progress. This building in addition to the electrical equipment contains fourteen fans of which seven are intake fans or blowers and seven are exhaust fans. It is calculated that for operation of the whole tunnel, the maximum number

of fans and blowers needed is twenty-four, of which twelve are blowers and twelve exhausters. They are divided equally in the two ventilation buildings. One exhaust fan and one intake fan in each of the buildings is a spare to be used in case it is needed during repair of one of the others. The intake fans draw the fresh air through openings or louvres in the sides of the building.

The exhaust fans are located in closed-in compartments. Each exhaust duct terminates in the compartment. The vitiated air is drawn from the tunnel into a compartment and expelled through a vertical duct running to a height of 8 feet above the roof of the building. Entrance for persons into each compartment is by means of a small lock or room having two iron doors which can be tightly closed, one leading from the building where the air conditions are normal and the other opening directly into the exhaust air compartment.

Plate I of the Annual Report ending December 31, 1932, contains a profile showing the air flow for ventilating the tunnel and the relative location of the two ventilation buildings.

Plate IV of this report is a view taken in the duct for exhaust air over the roadway.

The fans and blowers together with their housings were installed under contract with the G and N Engineering Company and are of Buffalo Forge Company make. They are designed to furnish sufficient air to properly ventilate the tunnel, assuming a maximum capacity of the tunnel to be 2,400 automobiles per hour travelling at the rate of seven miles an hour.

The contract maximum operating air supply and exhaust air is as follows:

For each Boston blower, 93,000 cubic feet per minute.

For each East Boston blower, 89,500 cubic feet per minute.

For each Boston exhaust fan, 95,000 cubic feet per minute.

For each East Boston exhaust fan, 91,500 cubic feet per minute.

This makes a total of 1,095,000 cubic feet of air per minute for twelve blowers and exhaust fans.

The fans are full-housed, double inlet type without inlet flues. They are operated by directly connected two-speed two-winding squirrel cage motors, the maximum synchronous speed being 450 revolutions per minute. The tip speed or speed of the outside end of the blade is 2,615 feet per minute. The fans in both buildings may be controlled individually at

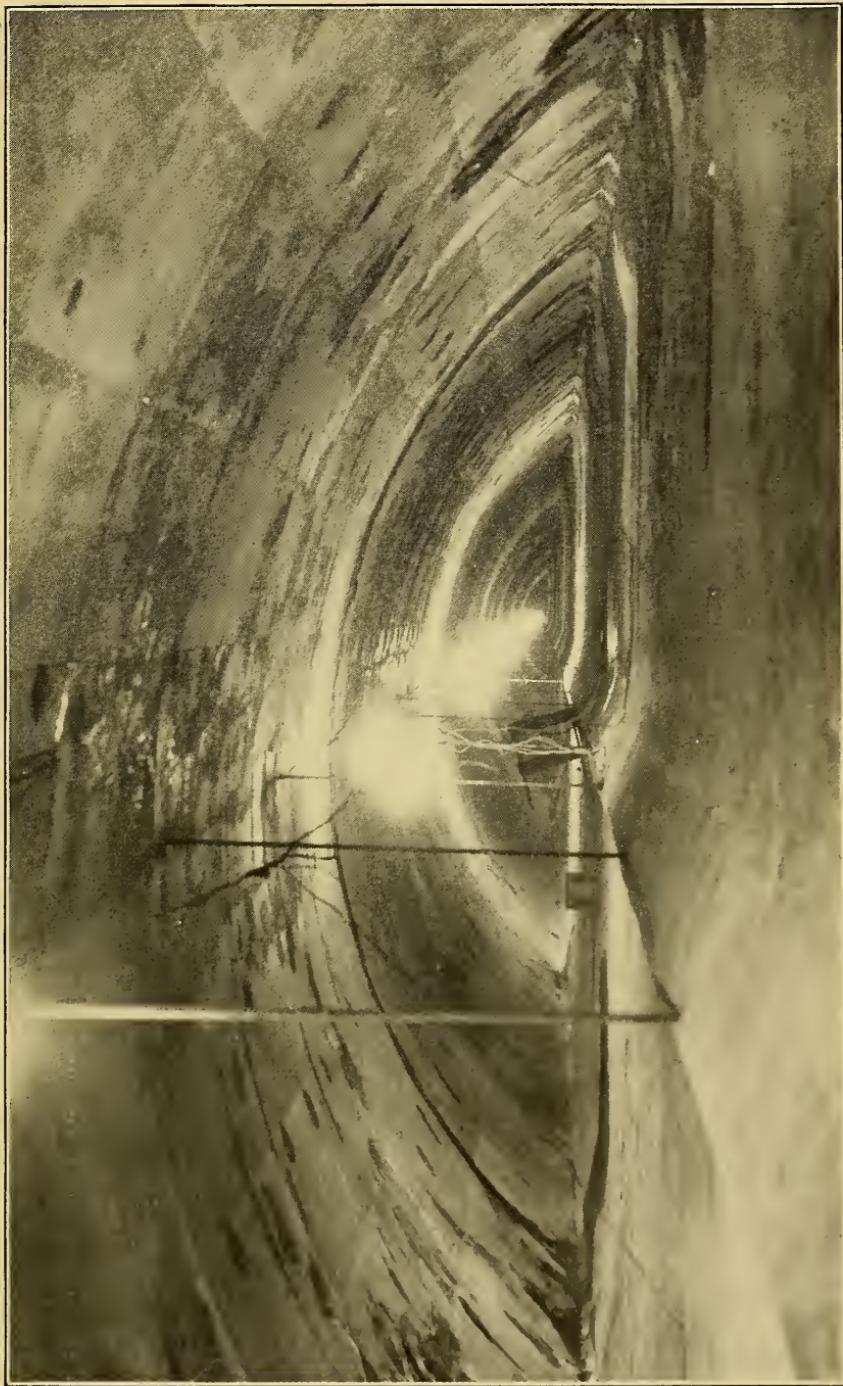


PLATE IV.—EXHAUST AIR DUCT. THE FLOOR OF THE DUCT IS THE TOP OF THE ROOF OVER THE ROADWAY.



PLATE V.—SOME OF THE INTAKE FANS LOCATED IN THE EAST BOSTON VENTILATION BUILDING.

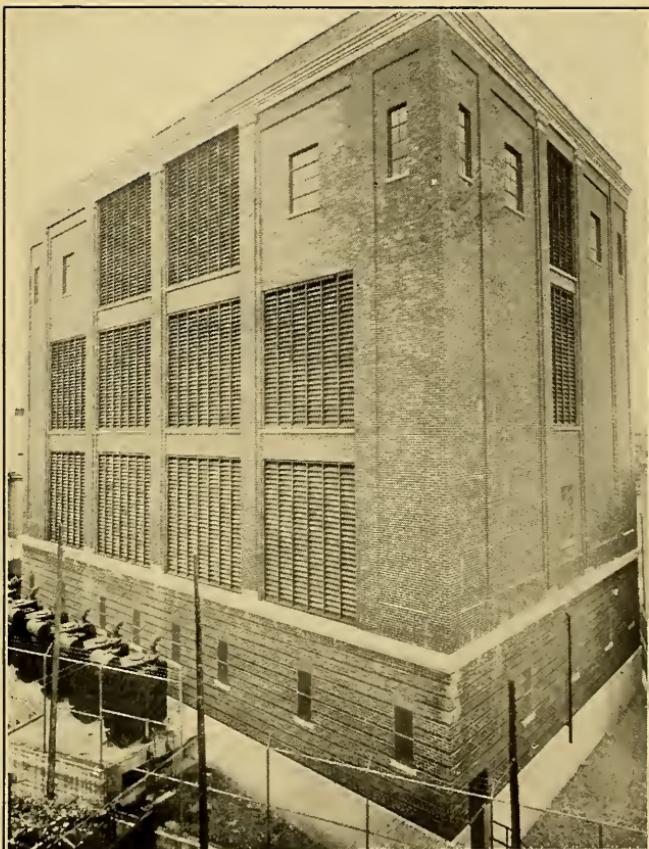
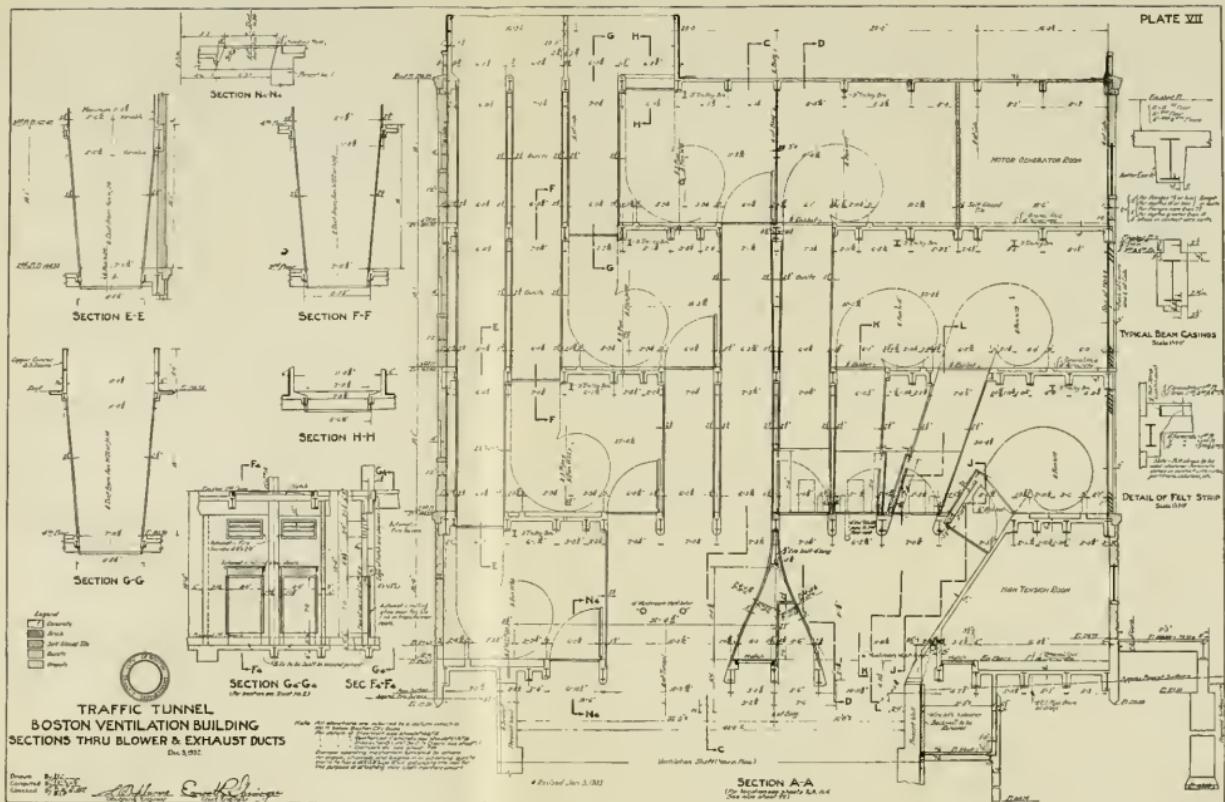


PLATE VI.—EAST BOSTON VENTILATION BUILDING
SHOWING LOUVRES IN REAR AND SIDE.



one centralized operating point in the Boston Ventilation Building or each fan may be controlled individually at its immediate location. The fans in the East Boston Building may also all be controlled at one centralized location in that building.

Each of the exhaust and fresh-air ducts near each fan in the ventilation buildings is equipped with a heavy steel damper. Operation of this damper is automatic by special mechanism. Each damper may also be operated by hand at its location. Mechanism for operating these dampers was made and installed under contract with the Underwood Machinery Company.

On the shaft of each fan opposite the motor is a tachometer which electrically records on the control board in the Boston Ventilation Building the revolutions per minute of the fan.

Plate V shows some of the intake fans in the East Boston Ventilation Building and is typical. Fans and blowers are of the same size.

Plate VI is a rear view of the East Boston Building on Liverpool street, showing the louvres for admission of fresh air to the fans.

As noted in the report for the year ending December 31, 1932, a test on a full-sized fan was made at the factory and calculations from the results were in progress at the end of that year. They show that the fan met all requirements of the specifications.

Plate VII is a vertical section through the Boston Ventilation Building showing the relative location of the blowers and exhaust fans on the floors of the Boston Ventilation Building.

Directly under the Boston shaft and again under the East Boston shaft the vertical fresh air duct divides to run along under the tunnel roadway in both directions; that is, toward the middle of the tunnel and toward the portal. At this dividing point in order to regulate or proportion the passage of the air in respective directions, there is a movable regulator or damper built of steel curved plates modelled on lines adapted to permit the free and regular flow of the air from the vertical ducts into the horizontal ducts. These regulators move on steel rails, and are operated electrically by special mechanism either by remote control in the Boston Ventilation Building or at the regulators.

Two similar regulators are placed at the same relative loca-

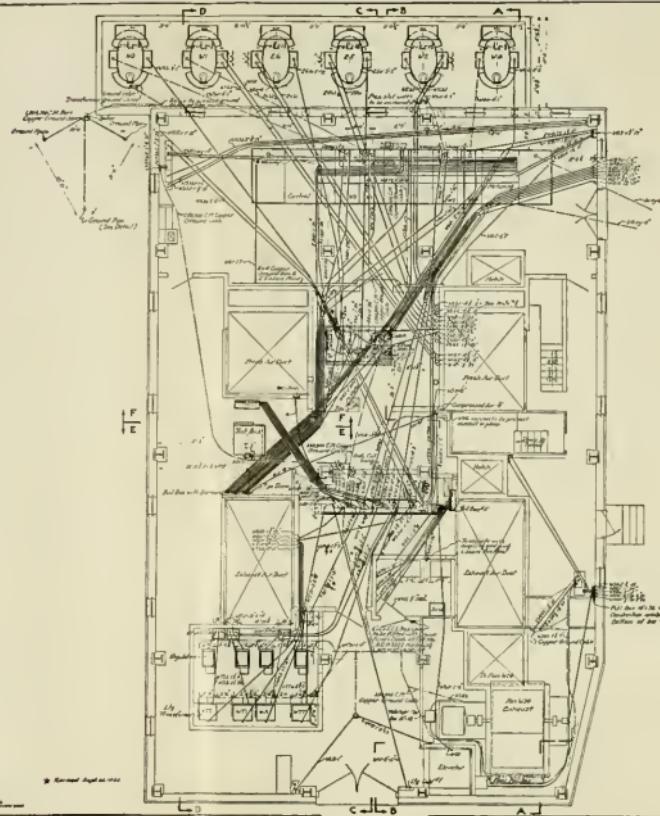
tions for proportioning the air flow from the horizontal exhaust ducts above the roadway at the point where they discharge into one common, vertical duct under each Ventilation Building, to be drawn up by the exhaust fans and discharged above the roof of the buildings.

The mechanism for operating these four regulators was furnished by the Boston Gear Works, Inc.

At spacing intervals of every 15 feet leading from both sides of the main fresh air duct under the roadway are small, rectangular ducts which lead the fresh air to the roadway level where it spreads out and emerges into the tunnel proper through a continuous narrow slot above a steel baffle plate running longitudinally for the length of and on both sides of the tunnel. The width of this slot, about one inch, can be adjusted to admit the proper flow of air. Adjustment of air may also be made by means of an asbestos-board damper at the mouth of each small rectangular duct where it leaves the main duct under the roadway.

The vitiated air from the tunnel passes through openings or air ports in the roof of the tunnel above the roadway into the exhaust air duct. The openings are 15 feet on centers and over each of the two lanes. They vary in area from 3 square feet at the far end of the exhaust ducts at the middle of the tunnel to $1\frac{1}{2}$ square feet at the ventilation shafts or at the point nearest the exhaust fans. The flow of air into the exhaust duct can be regulated, should it be necessary, by metallic slides in the air ports. These ports are to be covered with metallic grilles. Both the slides and grilles are to be made of Muntz metal which is non-corrosive.

After the completion of all building construction work called for in the first period of construction of the East Boston Ventilation Building, a contract was let to Quinn Brothers for furnishing and installing conduits and other equipment, for installing cables and wires in conduits, and for installing the electrical equipment furnished by the Westinghouse Electric & Manufacturing Company under contract. This contract with Quinn Brothers was also divided into two periods; the first to include the work which was to be done immediately such as foundations for machinery and apparatus and placing the conduits which were to be imbedded in the floors, the second period to include that work which could be done only after the completion of the floor and partitions in the building. The work of the first



DETAIL OF GROUND PIPE



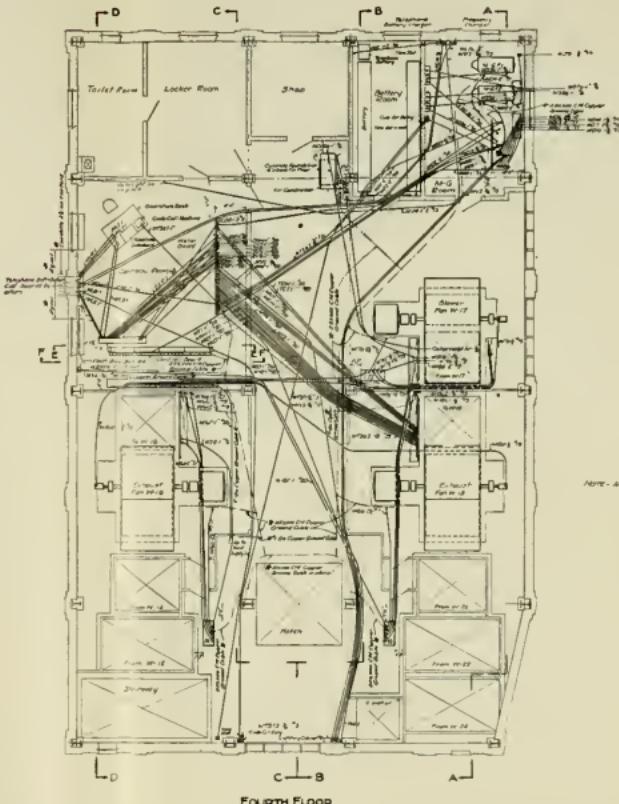
TRAFFIC TUNNEL
BOSTON VENTILATION BUILDING
EQUIPMENT INSTALLATION

Drawn
Traced
Colored by John

Dear Dr. D. B. Howe March 22, 1888

FIRST FLOOR

SHEET No.
PLAN No. 21546
S-1



FOURTH FLOOR



TRAFFIC TUNNEL
BOSTON VENTILATION BUILDING
EQUIPMENT INSTALLATION

Sept. 1953

Death By ~~1970~~ --
Second By ~~1970~~
Third By ~~1970~~

— *Boone* — — *Walter H. Davis* —

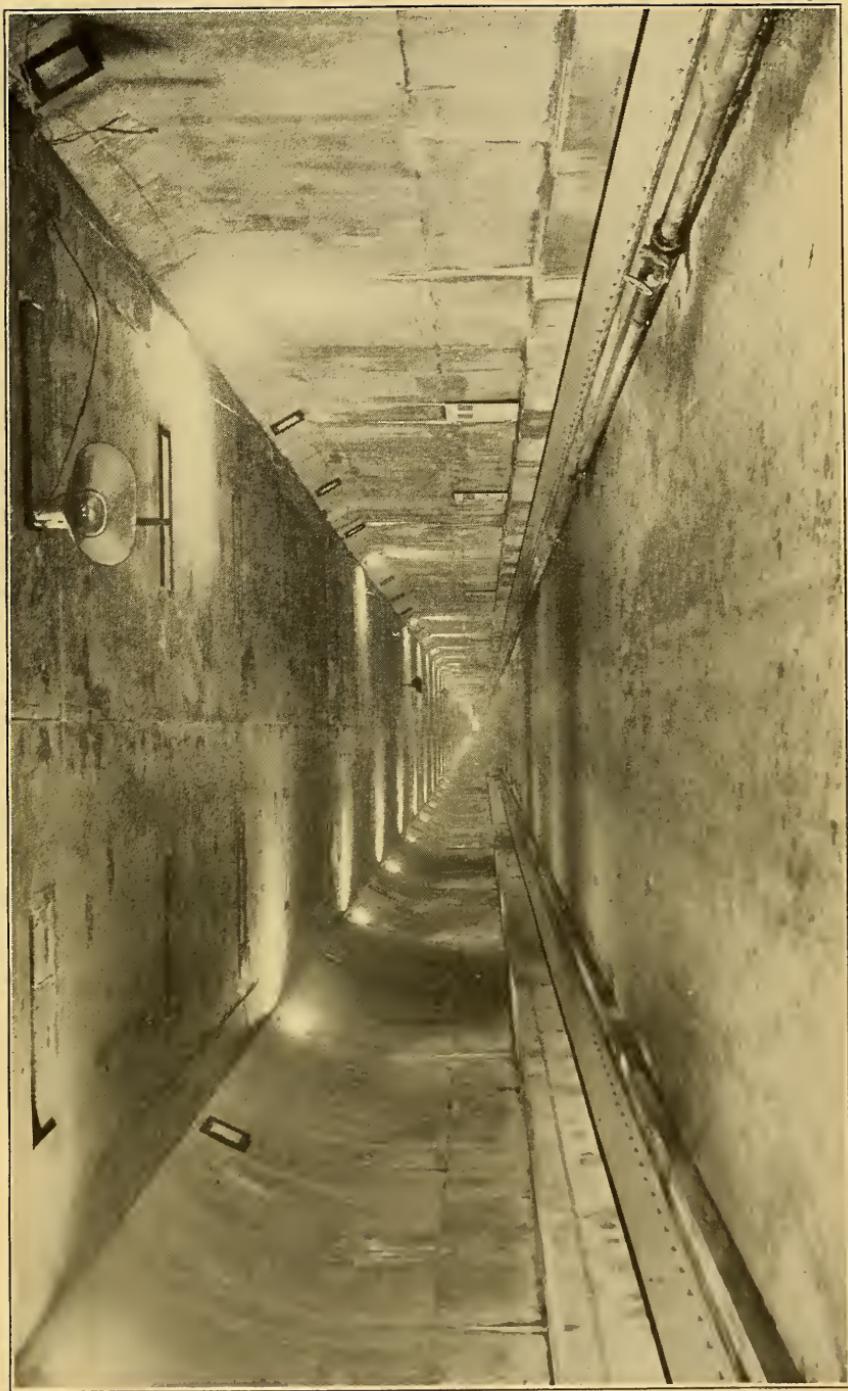


PLATE X.—INTERIOR VIEW OF TUNNEL SHOWING PAVED ROADWAY. THE TILE FINISH ON THE WALLS IS NOT YET INSTALLED.

period of the contract for electrical installation was completed in September of this year. Immediately after that the contractor for the construction of the East Boston Building began the work of his second period and completed it during the last of November. The second period of the contract for installing electrical equipment then began and at this date is well along.

Similar contracts were let during the year to Quinn Brothers for installing electrical equipment in the ventilation building on the Boston side. The work of the first period has been completed.

Plates VIII and IX show diagram of the intricate conduit system on two of the floors of the Boston Ventilation Building.

PAVING.

The permanent paving has been laid in the tunnel and on the incline in East Boston. It is of granite blocks. The blocks are 9 inches by 4 inches laid on a 1-inch sand bed and the joints are grouted. The pavement is laid on the concrete roadway slab which forms the top of a fresh air supply duct. The roadway slab was designed and built with a groove for edgestone at the sides and special granite edgestone was cut to meet the conditions. The stones are 5 inches wide and 13 inches deep.

As no traffic could be allowed on any newly laid pavement until it had become sufficiently set to resist injury on that account it was necessary to begin the paving at a point in the tunnel midway between the ends and to work both ways, the progress always being confined to two locations. Before work was started the blocks were brought into the tunnel and distributed along the northerly side leaving the southerly side unobstructed for the passage of trucks used for construction purposes.

In the roadway expansion strips were placed continuously at the junction of the granite edgestone and the granite block pavement and transversely, across the roadway, every 200 feet.

At the East Boston Plaza the blocks were laid on a 6-inch concrete base and the edgestone was of standard size.

The pavement was laid by Coleman Brothers under contract. The blocks were furnished and delivered in the tunnel by H. E. Fletcher Company under contract and the edgestone in the tunnel was furnished by Austin Ford & Son. The edgestone was set and grouted in place by labor forces of the department.

Plate X is a view inside the tunnel showing the finished paving.

DRAINAGE OF THE TUNNEL.

To take care of the drainage water the tunnel is equipped with seven pumps. Along the gutter on each side of the tunnel spaced 150 feet apart, are small catch-basins which connect with drains to take any surface or seepage water. These 6-inch drains lead to the pump well at the midway point of the tunnel under the harbor. This pump well is of 16,000-gallon capacity and has an overflow into the air intake ducts under the roadway for storage in case of an unusual accumulation of water.

Plate XI shows a plan and sections of this well and the dry well in which the pumps are located.

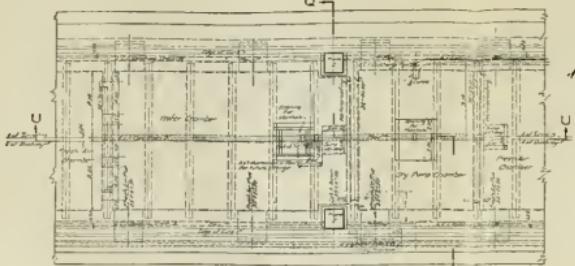
There are two horizontal pumps in this harbor pump well each of 500 gallons per minute capacity. They are non-clogging centrifugal pumps to operate against a dynamic head of 185 feet. There is also a 100-gallon per minute horizontal centrifugal pump to operate against the same head. The leakage into the tunnel is less than two gallons per minute, probably as small in proportion to the size and length of the tunnel as in any under-water tunnel in the world. This fact is attributed to the imperviousness of the clay through which the tunnel passes as well as to the type and quality of construction. It is probable that the 100-gallon pump will take care of all water entering the tunnel under normal conditions. The other pumps will be needed only in case of a breakdown or in case of extraordinary emergency such as a water pipe break causing an abnormal flow of water into the tunnel.

At the Boston end of the tunnel near the portal is a pump well containing two vertical non-clogging 250-gallon per minute pumps, each to operate against a dynamic head of 35 feet. At the East Boston end of the tunnel near the portal is a similar pump well and two similar pumps. The purpose of these two wells with pumps is to take care of the surface water entering at the inclines. The capacity of each well is 8,000 gallons.

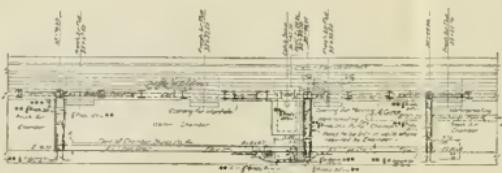
OTHER EQUIPMENT IN THE TUNNEL.

Along the north wall of the tunnel is a sidewalk raised 3 feet and 7 inches above the roadway level, solely for the use of the operating force in the tunnel.

Spaced at intervals in the side walls are niches for equipment for operation of the tunnel. Niches for fire extinguishers are 202 $\frac{1}{2}$ feet apart in each wall and are staggered in location so that



PLAN



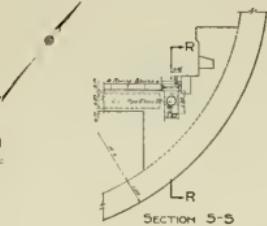
SECTION U-U
Scale 1 in. = 10 ft.

PUMP CHAMBER

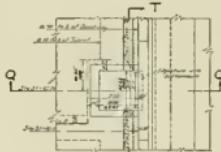


SECTION A
TRAFFIC TUNNEL
DRAINAGE DETAILS

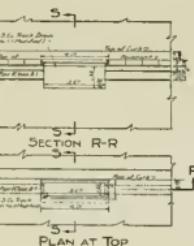
1978 All elevations are referred to a datum
which is 100' below Boston City Base
Cost via frames and service costs passing
out on this contract



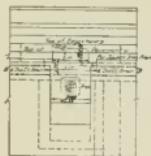
TYPICAL TUNNEL DRAIN INLET



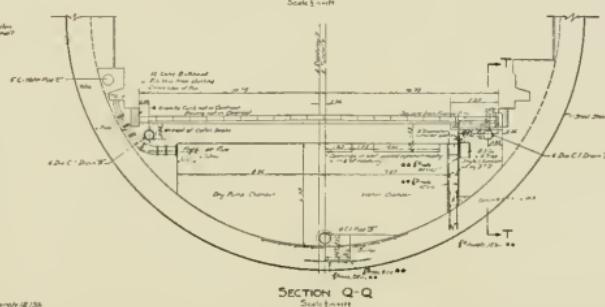
PLAN AT TOP



3-1
PLAN AT TOP



SECTION T-T



SECTION Q-Q

• • *Reddish mottled March 12, 1933.*

they occur in reality every 101 feet 3 inches. Niches for fire hose are 101 feet 3 inches apart and are in the south wall only. The water service is supplied to the tunnel through a 6-inch cast-iron pipe built into the south wall and running the entire length. This pipe has four connections with the mains, one in Porter street, East Boston, one in London street, East Boston, the connection running through the construction shaft, one in North square, Boston, the connection running through the tunnel roof, and one in Cross street, Boston. A telephone is located in each control niche group. Control niches for operating signals are spaced 405 feet apart in the north wall. The telephones will connect with the control room in the Boston Ventilation Building, with the Administration Building and with the garages at the plazas. There are also to be in the tunnel police signal alarm boxes connecting directly with police stations. All doors of niches are of enameled steel, white in color to match the tile finish and were furnished and installed under contract with Peterson & Neville, Inc.

ELECTRIC POWER.

In January, 1933, a contract was let to the Edison Electric Illuminating Company to supply electric energy for temporary power and lights for the Traffic Tunnel during the period of installing equipment for the permanent lights and power.

A contract was let to the Edison Electric Illuminating Company in April, 1933, for furnishing electric power for the tunnel after its completion.

The permanent service will be supplied by two 13,800-volt, 3-phase, 60-cycle transmission lines terminating at a bus in the East Boston Ventilation Building, and by two similar lines terminating at a bus in the Boston Ventilation Building.

TILE FINISH.

In November a contract was let to C. M. Tyler Company for furnishing and placing vitrified glazed tile on the walls of the tunnel. Manufacture of the tile is now in progress. The tile are 8 inches by 8 inches by $\frac{1}{8}$ inch thick. They are to be laid so as not to break joint in either direction. They are to be attached to the wall by means of metal spacers or clips. To these spacers are to be attached $\frac{3}{16}$ -inch round rods running longitudinally. The horizontal edges of the tile are to be grooved so as to fit over the rod. The spacers are to be of

such dimensions that the rod and tile will set out from the wall $\frac{3}{4}$ of an inch to allow a continuous space between the back of the tile and the concrete wall in all directions. The spacers are to be placed at the corners of the tiles, every other joint alternating with a concrete pat 3 inches square.

Air will enter the space behind the tile through grilles in the bottom row and will be drawn out into the exhaust duct of the tunnel above the roadway through holes cut through the concrete slab in back of and above the top row of tile. It is expected that the circulation of air will tend to dry up any seepage or dampness which may come through the tunnel walls. All metal, including the rods and spaces, is of a rust proof alloy.

During the year samples of lighting units for the Traffic Tunnel were installed for tests. A contract was let for furnishing these units to the Westinghouse Electric & Manufacturing Company. The frames are of a rust-resisting metal. The glass is a flashed opal. The reflectors are porcelain enamel. They are spaced in both walls 20 feet 3 inches on centers above the roadway near the roof except at the portals where the spacing is decreased to about 10 feet $1\frac{1}{2}$ inches and again to 7 feet. They will be equipped with 200-watt lamps. The wiring for the lights was done under contract with H. M. Haley Company.

STREET WIDENINGS.

Porter street in East Boston, between Chelsea street and Central square, before widening, was only 50 feet in width. In order to provide adequate approaches to the tunnel the street was widened between these points to 100 feet. This widening required the removal of 30 buildings, mostly of wood, and filling in the cellars, grading and constructing new pavement for the entire width of the street.

Plate XII shows the width of Porter street before widening and the widening under construction.

In March, a contract was let to the Chelsea Building Wrecking Company for removal of buildings for this widening, all located on the southerly side of Porter street.

Furnishing gravel and filling in the cellars was let to A. Singarella. As the filling progressed, the tops of the old foundation walls were removed to a depth of 4 feet below the finished grade of the street. New drains were constructed, new catch-basins built, water pipes laid, ducts and pipes by various corporations were laid and others were relocated.



PLATE XII.—SHOWING WIDTH OF PORTER STREET BEFORE BUILDINGS WERE REMOVED AND THE WIDTH IT WILL BE AFTER THE WIDENING.

After proper settlement had taken place, a contract was let also to A. Singarella for repaving the street. The contract consisted of removing the old granite block pavement, rolling, resetting edgestone, building new granolithic sidewalks on both sides of the street, placing concrete base and a bitulithic top. It also included iron fences along a part of the street line and construction of safety islands in the center of Porter street. This street widening was completed in November.

On the Boston side contracts were let for removal of the remaining buildings for the North and Cross street widenings east of Hanover street. This work comprised removing twenty-two brick buildings let to the Atlantic Building Wrecking Company, also removing one building on Merchants Row let to the Chelsea Building Wrecking Company.

On May 31, under authority of chapter 297, Acts of 1929, as amended by chapter 287, Acts of 1932, additional takings of land and buildings were made by the Department for additional traffic improvements west of Hanover street. These improvements include widening of Cross street, from Hanover street to Haymarket square, widening of Merrimac street, from Haymarket square to Portland street, and the enlargement of Haymarket square and construction of a traffic circle therein, including underpasses for pedestrians.

The removal of these buildings, thirty-three in number, was let under five contracts as follows:

- 2 contracts to the City Building Wrecking Company.
- 1 contract to the Chelsea Building Wrecking Company.
- 1 contract to the New England Building Wrecking Company.
- 1 contract to the Atlantic Building Wrecking Company.

The removal of all buildings on account of the Traffic Tunnel, plazas, ventilation buildings and street widenings is now complete and a summary is as follows:

On the East Boston side, about 64 buildings, mostly of wood.

On the Boston side, about 101 buildings, mostly of brick or stone.

Total number of buildings removed, about 165.

After the removal of buildings for the North and Cross street widenings east of Hanover street, a contract was let to F. L. Trainor for furnishing gravel to fill in the old cellars. In conjunction with placing the gravel the tops of the old foundation

walls were removed to 4 feet below the proposed finished grade of the street and with gasoline shovels the stones of the old walls were mixed with the gravel and the bricks from the old buildings some of which had been left in the cellars for that purpose.

North street, from Blackstone street to Cross street, located in the center of the market district was formerly narrow and congested, averaging about 40 feet in width. Cross street was also a narrow thoroughfare, about 30 feet in width. These streets are to take most of the traffic to and from the tunnel. North street is being widened on the easterly side to a width of about 86 feet and Cross street is being widened on the northerly side to a minimum width of 90 feet. This widening will require new pavement over the entire width of both these thoroughfares.

In November, after proper settlement of the filling had taken place, a contract was let to A. R. Doyle, Inc., for permanent paving on account of the North and Cross street widenings east of Hanover street. The work also includes paving the Boston Plaza and the open incline to the tunnel portal, incidental work of constructing new sewers in Cross and North streets, construction of drains, catch-basins, laying ducts and building manholes for electric cables in the plaza area, grading, rolling, furnishing and setting edgestone, setting light poles and building a retaining wall at the north side of the plaza.

This pavement is all to be of granite block with grouted joints on a concrete base. The granite blocks for this work except those for the plaza are being furnished under contract with the Lovejoy Granite Company. Work of cutting these blocks at the quarry has been in progress since the first of November.

In conjunction with these street widenings on the Boston side east of Hanover street, public service corporations relocated and laid new ducts and pipes. The Public Works Department of the City of Boston laid a new high pressure fire service for the length of Cross street, between Commercial street and Hanover street. Plate I of the Annual Report for the year ending December 31, 1932, shows the proposed street widenings in East Boston and in Boston west of Hanover street.

OTHER WORK ON THE TRAFFIC TUNNEL.

It was found that the bottom of the foundation of the rear of the building 221 Hanover street which abuts on the Boston Plaza was higher than the proposed grade of the surface of the new plaza. The foundation was of a rubble construction. It was necessary to support the rear wall of this three-story brick building on steel beams, remove the old rubble foundation, excavate for and build a new concrete foundation and underpin the brick building wall onto it. The new wall was about 12 feet in height. This work was done directly by the labor forces of the department.

A contract was let to M. Solimando for furnishing and placing granite facing at the Boston Portal and at the East Boston Portal, and the work has been completed.

A contract was let to The Gorham Company for furnishing and placing bronze insignia and letters at the same locations. This work was completed during this year. John F. Paramino was engaged as sculptor for design of the bronze work.

During the year two contracts were let to the Wetmore-Savage Electric Supply Company for furnishing signal and other cable and wire for the Traffic Tunnel and to the Graybar Electric Company, Inc., for furnishing 2,300-volt cable. Much of this cable and wire has been installed during the year. Altogether there will be over 3,560,000 conductor feet or about 675 miles of wire installed in the Traffic Tunnel for operating fans, lights, signals, telephones, pumps, etc.

In December a contract was let to J. A. Singarella Company for building a garage for the Traffic Tunnel at the East Boston Plaza. Construction work has not yet been started.

TESTING MATERIALS AND INSPECTIONS.

During the year extensive tests were made on materials and equipment to be used for the Traffic Tunnel.

Tests on samples of many makes of vitreous glazed ceramic tile were made before the award of the contract. Tests are now being made on samples of tile to be furnished by the contractor for tiling. These tests are being made by the Department of Ceramics at Massachusetts Institute of Technology and by the Department of Ceramics at Rutgers University in New Jersey.

Tests on samples of all cement used on construction work were made by Charles N. Ryan, cement tester for the Public Works Department of the City of Boston.

Tests for waterproofing material were made by Thompson & Lichtner Company, Inc. This company also made analyses of water for determining the acid contents, also periodical analyses of air in the Traffic Tunnel for impurities harmful to the workmen before the ventilating fans can be put in operation.

Inspection and tests on all cable furnished to the department were made at the factories by the Electrical Testing Laboratories of New York.

Inspection of all construction work was made by experienced employees of the department.

The labor force of the department, averaging about 100 men, has been engaged on miscellaneous small works chiefly in connection with the Traffic Tunnel. Ironworkers have fabricated and erected steel plates for covering splicing chambers in the tunnel, for the movable regulating dampers in the air ducts at locations in the ventilation shafts. They have fabricated a steel pipe rail fence which is to run along the edge of the sidewalk in the Traffic Tunnel. They have also strengthened some steel work in the superstructure of the Atlantic avenue chambers in State street which was found to be corroded.

The labor force of the department has handled and delivered to the Transit Department stockyards for use in the Traffic Tunnel materials such as cable reels, steel rods, steel plates and beams. They have moved a large quantity of lumber temporarily stored on Commonwealth avenue to the Transit Department stockyard and elsewhere, and have grouted leaks in various subways and tunnels.

In December of this year the labor force of the department was increased by a quota of 22 ironworkers, 22 painters and 8 laborers furnished under the C. W. A. The ironworkers have been employed in removing, replacing and adjusting baffle plates in the Traffic Tunnel and have assisted the permanent ironworkers in other work. The painters have painted baffle and splicing chamber plates in the Traffic Tunnel.

HUNTINGTON AVENUE SUBWAY.

In accordance with Section 9, Part 2 of chapter 366 of the Acts of 1933, investigation, surveys, plans, borings and estimates of cost were made for Huntington Avenue Subway.

Several studies were contemplated on connecting with the Boylston Street Subway at or near Copley square.

Study No. 1 contemplated an incline in Huntington avenue a little east of Longwood avenue and running under Huntington avenue and connecting with the Boylston Street Subway in Copley square at the junction of Boylston street and Huntington avenue with stations at the Museum of Fine Arts, Massachusetts avenue, Mechanics Building and Copley square.

Study No. 2 contemplated a shorter subway with an incline in Huntington avenue, between Opera place and Gainsborough street, the subway running under Huntington avenue and joining the Boylston Street Subway at the same location as just noted with stations at Massachusetts avenue, Mechanics Building and Copley square.

Study No. 3 contemplated a still shorter subway having an incline in Huntington avenue just south of Garrison street running under Huntington avenue, passing under the Boston & Albany Railroad tracks and connecting with the Boylston Street Subway as noted for the previous studies. A station was proposed at Copley square.

Study No. 4 contemplated an incline in Huntington avenue a little south of Garrison street, thence curving to the north, passing under the Boston & Albany Railroad tracks and yard and connecting with the Boylston Street Subway just west of the Copley Station. There would be no new stations in this scheme.

Study No. 5 was similar except that the subway passed under Exeter street instead of the Boston & Albany Railroad yard.

Study No. 6 contemplated simply an incline in Huntington avenue, just west of Copley square, a station in Copley square and a connection with the Boylston Street Subway at the junction of Huntington avenue and Boylston street.

The construction of a Huntington Avenue Subway was not approved by the State Board appointed to act on proposals to be done under the National Recovery Act.

Respectfully submitted,

WILBUR W. DAVIS,
Chief Engineer.

